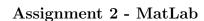
American University of Beirut

Department of Computer Science

CMPS 251 - Numerical Analysis & Computing





You should submit your answer in one file, named "your_name.m", containing all your codes

Exercise 1 Write a MatLab code "MyLUP.m" that, given a $n \times n$ matrix A, returns the LU-decomposition of A with partial pivoting your code should returns L, U, and P

Exercise 2 Consider the data set S

$$\{(x_0, y_0), (x_1, y_1), \dots, (x_n, y_n)\}\$$

- a) Write a MatLab function "MyNewton.m" that takes S as input, and returns the divided difference table
- b) Test your program for

c) Plot the resulting polynomial together with the true function $\cos x$ over $[-\pi, +\pi]$ (you may find the MatLab commands "x = -pi:0.01:pi" then "plot(x,cos(x))" useful to visualize the cosine function, and with little effort plot also the polynomial)

Exercise 3 write a Matlab code "[z, M]=MySpline.m" that takes as input a set of data

$$\{(t_0, y_0), (t_1, y_1), \dots, (t_n, y_n)\}$$

and returns the value of the vector z, and a matrix M whose entries are the coefficients of $S_i(x)$